



## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

#### 14 CFR Part 39

[Docket No. FAA-2023-0653; Project Identifier AD-2023-00280-E; Amendment 39-22429; AD 2023-09-06]

RIN 2120-AA64

#### Airworthiness Directives; CFM International, S.A. Turbofan Engines

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final rule.

**SUMMARY:** The FAA is adopting a new airworthiness directive (AD) for all CFM International, S.A. (CFM) LEAP-1A23, LEAP-1A24, LEAP-1A24E1, LEAP-1A26, LEAP-1A26CJ, LEAP-1A26E1, LEAP-1A29, LEAP-1A29CJ, LEAP-1A30, LEAP-1A32, LEAP-1A33, LEAP-1A33B2, and LEAP-1A35A (LEAP-1A) model turbofan engines. This AD was prompted by a manufacturer investigation that revealed that certain high-pressure turbine (HPT) rotor stage 1 disks (HPT stage 1 disks), forward outer seals, and compressor rotor stages 6-10 spools were manufactured from material suspected to have reduced material properties due to iron inclusion. This AD requires replacement of certain HPT stage 1 disks, forward outer seals, and compressor rotor stages 6-10 spools. The FAA is issuing this AD to address the unsafe condition on these products.

**DATES:** This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

The Director of the Federal Register approved the incorporation by reference of certain publications listed in this AD as of [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

#### ADDRESSES:

*AD Docket:* You may examine the AD docket at [regulations.gov](https://www.regulations.gov) by searching for and locating Docket No. FAA-2023-0653; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this final rule, any comments received, and other information. The address for Docket

Operations is U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.

*Material Incorporated by Reference:*

- For service information identified in this final rule, contact CFM International, S.A., GE Aviation Fleet Support, 1 Neumann Way, M/D Room 285, Cincinnati, OH 45215; phone: (877) 432-3272; email: [aviation.fleetsupport@ge.com](mailto:aviation.fleetsupport@ge.com).

- You may view this service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (817) 222-5110. It is also available at [regulations.gov](https://www.regulations.gov) by searching for and locating Docket No. FAA-2023-0653.

**FOR FURTHER INFORMATION CONTACT:** Mehdi Lamnyi, Aviation Safety Engineer, Continued Operational Safety Branch, FAA, 2200 South 216th St., Des Moines, WA 98198; phone: (781) 238-7743; email: [Mehdi.Lamnyi@faa.gov](mailto:Mehdi.Lamnyi@faa.gov).

**SUPPLEMENTARY INFORMATION:**

**Background**

The FAA issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 by adding an AD that would apply to all CFM LEAP-1A model turbofan engines. The NPRM published in the *Federal Register* on March 24, 2023 (88 FR 17753). The NPRM was prompted by notification from the manufacturer that iron inclusion was detected in three non-LEAP-1A HPT rotor disks. Further investigation by the manufacturer determined that the iron inclusion is attributed to deficiencies in the manufacturing process. The investigation by the manufacturer also determined that certain CFM LEAP-1A HPT stage 1 disks, forward outer seals, and compressor rotor stages 6-10 spools manufactured using the same process may have reduced material properties and a lower fatigue life capability due to iron inclusion, which may cause premature fracture and subsequent uncontained failure of certain HPT stage 1 disks, forward outer seals, and compressor rotor stages 6-10 spools. In the NPRM, the FAA proposed to require replacement of certain HPT stage 1 disks, forward outer seals, and compressor rotor stages 6-10 spools. The FAA also proposed to prohibit installation of an HPT stage 1

disk, forward outer seal, or compressor rotor stages 6-10 spool that has a part number and serial number identified in the service information onto any engine. The FAA is issuing this AD to address the unsafe condition on these products.

## **Discussion of Final Airworthiness Directive**

### **Comments**

The FAA received one comment, from Air Line Pilots Association, International (ALPA). ALPA supported the NPRM without change.

### **Additional Changes Made to This Final Rule**

Since the NPRM published, the FAA determined the need to change a part name in the final rule from “stages 6-10 compressor rotor spool” to “compressor rotor stages 6-10 spool,” to make the nomenclature consistent with the service information. The FAA has revised this final rule to incorporate this change.

### **Conclusion**

The FAA reviewed the relevant data, considered the comments received, and determined that air safety requires adopting the AD as proposed. Accordingly, the FAA is issuing this AD to address the unsafe condition on these products. Except for minor editorial changes, including the change described above and a change to the contact address for service information, this AD is adopted as proposed in the NPRM. None of the changes will increase the economic burden on any operator.

### **Related Service Information under 1 CFR part 51**

The FAA reviewed the following service information issued by CFM, which identify the part numbers and serial numbers of HPT stage 1 disks, forward outer seals, and compressor rotor stages 6-10 spools with potentially reduced material properties and specify procedures for replacement of these parts. These documents are distinct since they apply to different engine serial numbers.

- Service Bulletin LEAP-1A-72-00-0470-01A-930A-D, Issue 003, dated March 3, 2023.
- Service Bulletin LEAP-1A-72-00-0493-01A-930A-D, Issue 002, dated November 17, 2022.

• Service Bulletin LEAP-1A-72-00-0496-01A-930A-D, Issue 001, dated March 7, 2023.

This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in the ADDRESSES section.

### **Costs of Compliance**

The FAA estimates that this AD affects 38 engines installed on airplanes of U.S. registry.

The FAA estimates the following costs to comply with this AD:

#### **Estimated costs**

<b>Action</b>	<b>Labor Cost</b>	<b>Parts Cost</b>	<b>Cost per product</b>	<b>Cost on U.S. operators</b>
Replace HPT stage 1 disk (38 affected parts)	8 work-hours x \$85 per hour = \$680	\$215,635 (pro-rated)	\$216,315	\$8,219,970
Replace forward outer seal (24 affected parts)	8 work-hours x \$85 per hour = \$680	\$47,500 (pro-rated)	\$48,180	\$1,156,320
Replace compressor rotor stages 6-10 spool (15 affected parts)	8 work-hours x \$85 per hour = \$680	\$37,660 (pro-rated)	\$38,340	\$575,100

### **Authority for this Rulemaking**

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency's authority.

The FAA is issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: General requirements. Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority

because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

### **Regulatory Findings**

This AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Will not affect intrastate aviation in Alaska, and
- (3) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

### **List of Subjects in 14 CFR Part 39**

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

### **The Amendment**

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

### **PART 39 - AIRWORTHINESS DIRECTIVES**

- 1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

#### **§ 39.13 [Amended]**

- 2. The FAA amends § 39.13 by adding the following new airworthiness directive:

**2023-09-06 CFM International, S.A.:** Amendment 39-22429; Docket No. FAA-2023-0653; Project Identifier AD-2023-00280-E.

#### **(a) Effective Date**

This airworthiness directive (AD) is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

#### **(b) Affected ADs**

None.

**(c) Applicability**

This AD applies to CFM International, S.A. (CFM) LEAP-1A23, LEAP-1A24, LEAP-1A24E1, LEAP-1A26, LEAP-1A26CJ, LEAP-1A26E1, LEAP-1A29, LEAP-1A29CJ, LEAP-1A30, LEAP-1A32, LEAP-1A33, LEAP-1A33B2, and LEAP-1A35A model turbofan engines.

**(d) Subject**

Joint Aircraft System Component (JASC) Code 7230, Turbine Engine Compressor Section; 7250, Turbine Section.

**(e) Unsafe Condition**

This AD was prompted by a manufacturer investigation that revealed that certain HPT stage 1 disks, forward outer seals, and compressor rotor stages 6-10 spools were manufactured from material suspected to have reduced material properties due to iron inclusion. The FAA is issuing this AD to prevent fracture and subsequent uncontained failure of certain high-pressure turbine (HPT) stage 1 disks, forward outer seals, and compressor rotor stages 6-10 spools. The unsafe condition, if not addressed, could result in uncontained debris release, damage to the engine, and damage to the aircraft.

**(f) Compliance**

Comply with this AD within the compliance times specified, unless already done.

**(g) Required Actions**

(1) For engines with an installed HPT stage 1 disk, forward outer seal, or compressor rotor stages 6-10 spool having a part number (P/N) and serial number (S/N) identified in Compliance, paragraph 3.E., Tables 1 through 9, of CFM Service Bulletin (SB) LEAP-1A-72-00-0496-01A-930A-D, Issue 001, dated March 7, 2023 (CFM SB LEAP-1A-72-00-0496-01A-930A-D): At the next piece-part exposure of the HPT stage 1 disk, forward outer seal, or compressor rotor stages 6-10 spool, as applicable, or before exceeding the applicable cycles since new (CSN) threshold identified in Compliance, paragraph 3.E., Tables 1 through 9, of CFM SB LEAP-1A-72-00-0496-01A-930A-D, whichever occurs first after the effective date of this AD; or if the applicable CSN threshold has been exceeded as of the effective date of this AD, within 50 flight cycles (FCs) from the effective date of this AD; remove the HPT stage 1 disk, forward outer

seal, or compressor rotor stages 6-10 spool, as applicable, from service and replace with a part eligible for installation.

(2) For engines with an installed forward outer seal having a P/N and S/N identified in Compliance, paragraph 3.E., Tables 1 through 2, of CFM SB LEAP-1A-72-00-0470-01A-930A-D, Issue 003, dated March 3, 2023 (CFM SB LEAP-1A-72-00-0470-01A-930A-D): At the next piece-part exposure of the forward outer seal, or before exceeding the applicable CSN threshold identified in Compliance, paragraph 3.E., Tables 1 through 2, of CFM SB LEAP-1A-72-00-0470-01A-930A-D, whichever occurs first after the effective date of this AD; or if the applicable CSN threshold has been exceeded as of the effective date of this AD, within 50 FCs from the effective date of this AD; remove the forward outer seal from service and replace with a part eligible for installation.

(3) For engines with an installed HPT stage 1 disk having a P/N and S/N identified in Compliance, paragraph 3.E., Tables 1 through 2, of CFM SB LEAP-1A-72-00-0493-01A-930A-D, Issue 002, dated November 17, 2022 (CFM SB LEAP-1A-72-00-0493-01A-930A-D): At the next piece-part exposure of the HPT stage 1 disk, or before exceeding the applicable CSN threshold identified in Compliance, paragraph 3.E., Tables 1 through 2, of CFM SB LEAP-1A-72-00-0493-01A-930A-D, whichever occurs first after the effective date of this AD; or if the applicable CSN threshold has been exceeded as of the effective date of this AD, within 50 FCs from the effective date of this AD; remove the HPT stage 1 disk from service and replace with a part eligible for installation.

**(h) Definition**

For the purpose of this AD, a “part eligible for installation” is an HPT stage 1 disk, forward outer seal, or compressor rotor stages 6-10 spool that does not have a P/N and S/N identified in the service information listed in paragraphs (g)(1) through (3) of this AD.

**(i) Installation Prohibition**

After the effective date of this AD, do not install an HPT stage 1 disk, forward outer seal, or compressor rotor stages 6-10 spool that has a P/N and S/N identified in the service information listed in paragraphs (g)(1) through (3) of this AD on any engine.

**(j) Alternative Methods of Compliance (AMOCs)**

(1) The Manager, Continued Operational Safety Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (k) of this AD and email to: ANE-AD-AMOC@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

**(k) Related Information**

For more information about this AD, contact Mehdi Lamnyi, Aviation Safety Engineer, Continued Operational Safety Branch, FAA, 2200 South 216th St., Des Moines, WA 98198; phone: (781) 238-7743; email: Mehdi.Lamnyi@faa.gov.

**(l) Material Incorporated by Reference**

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) CFM International, S.A. Service Bulletin LEAP-1A-72-00-0470-01A-930A-D, Issue 003, dated March 3, 2023.

(ii) CFM International, S.A. Service Bulletin LEAP-1A-72-00-0493-01A-930A-D, Issue 002, dated November 17, 2022.

(iii) CFM International, S.A. Service Bulletin LEAP-1A-72-00-0496-01A-930A-D, Issue 001, dated March 7, 2023.



(3) For service information identified in this AD, contact CFM International, S.A., GE Aviation Fleet Support, 1 Neumann Way, M/D Room 285, Cincinnati, OH 45215; phone: (877) 432-3272; email: [aviation.fleetsupport@ge.com](mailto:aviation.fleetsupport@ge.com).

(4) You may view this service information at FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (817) 222-5110.

(5) You may view this service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email: [fr.inspection@nara.gov](mailto:fr.inspection@nara.gov), or go to: [www.archives.gov/federal-register/cfr/ibr-locations.html](http://www.archives.gov/federal-register/cfr/ibr-locations.html).

Issued on May 8, 2023.

Michael Linegang, Acting Director,  
Compliance & Airworthiness Division,  
Aircraft Certification Service.

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